OBSERVATIONS & RECOMMENDATIONS

After reviewing data collected from **BIG PEA PORRIDGE POND** and **MIDDLE PEA PORRIDGE POND**, the program coordinators have made the following observations and recommendations:

Thank you for your continued hard work sampling the lake/pond this season! Your monitoring group sampled **the lake three** this season! As you know, with multiple sampling events each season, we will be able to more accurately detect changes in water quality. Keep up the good work!

We would like to encourage your monitoring group to formally participate in the DES Weed Watchers program, a volunteer program dedicated to monitoring the lakes and ponds for the presence of exotic aquatic plants. This program only involves a small amount of time during the summer months. Volunteers survey their waterbody once a month from **June** through **September**. To survey, volunteers slowly boat, or even snorkel, around the perimeter of the waterbody and any islands it may contain. Using the materials provided in the Weed Watchers Kit, volunteers look for any species that are of suspicion. After a trip or two around the waterbody, volunteers will have a good knowledge of its plant community and will immediately notice even the most subtle changes. If a suspicious plant is found, the volunteers will send a specimen to DES for identification. If the plant specimen is an exotic, a biologist will visit the site to determine the extent of the problem and to formulate a plan of action to control the nuisance infestation. Remember that early detection is the key to controlling the spread of exotic plants.

If you would like to help protect your lake or pond from exotic plants, contact Amy Smagula, Exotic Species Program Coordinator, at 271-2248 or visit the Weed Watchers web page at www.des.state.nh.us/wmb/exoticspecies/survey.htm.

FIGURE INTERPRETATION

- **Figure 1 and Table 1:** The graphs in Figure 1 (Appendix A) show the historical and current year chlorophyll-a concentration in the water column. Table 1 (Appendix B) lists the maximum, minimum, and mean concentration for each sampling season that the lake/pond has been monitored through the program.

  Chlorophyll-a, a pigment found in plants, is an indicator of the algal abundance. Because algae are usually microscopic plants that contain chlorophyll-a, and are naturally found in lake ecosystems, the chlorophyll-a concentration measured in the water gives an estimation of the algal concentration or lake productivity. **The mean (average) summer chlorophyll-a concentration for New Hampshire's lakes and ponds is 7.02 mg/m³.**

  BIG PEA PORRIDGE POND
  The current year data (the top graph) show that the chlorophyll-a concentration ***decreased slightly*** from **June** to **July**, and then ***increased slightly*** from **July** to **August**. The chlorophyll-a concentration on **each sampling event** was ***much less than*** the state mean.

  Overall, visual inspection of the historical data trend line (the bottom graph) shows a ***relatively stable*** in-lake chlorophyll-a trend since monitoring began. Specifically, the mean concentration has ***remained between approximately 1.5 and 3.1 mg/m³*** since ***1995***.

  MIDDLE PEA PORRIDGE POND
  The current year data (the top graph) show that the chlorophyll-a concentration ***remained relatively stable*** from **June** to **August**. The chlorophyll-a concentration on **each sampling event** was ***much less than*** the state mean.

  Overall, visual inspection of the historical data trend line (the bottom graph) shows a ***slightly variable*** in-lake chlorophyll-a trend since monitoring began. Specifically, the mean concentration has ***fluctuated between approximately 1.4 and 4.3 mg/m³*** since ***1995.***

  In the 2005 annual report, since your group will have sampled the chlorophyll-a concentration at the deep spot of both ponds for at least 10 consecutive years, we will conduct a statistical analysis of the historic data to determine if there has been a significant change in the annual mean since monitoring began.

While algae are naturally present in all lakes/ponds, an excessive or increasing amount of any type is not welcomed. In freshwater lakes/ponds, phosphorus is the nutrient that algae depend upon for growth. Algal concentrations may increase with an increase in nonpoint sources of phosphorus loading from the watershed, or in-lake sources of phosphorus loading (such as phosphorus releases from the sediments). Therefore, it is extremely important for volunteer monitors to continually educate residents about how activities within the watershed can affect phosphorus loading and lake/pond quality.

- **Figure 2 and Table 3:** The graphs in Figure 2 (Appendix A) show historical and current year data for lake/pond transparency. Table 3 (Appendix B) lists the maximum, minimum and mean transparency data for each sampling season that the lake/pond has been monitored through the program.

Volunteer monitors use the Secchi-disk, a 20 cm disk with alternating black and white quadrants, to measure water clarity (how far a person can see into the water). Transparency, a measure of water clarity, can be affected by the amount of algae and sediment from erosion, as well as the natural colors of the water. **The mean (average) summer transparency for New Hampshire's lakes and ponds is 3.7 meters.**

BIG PEA PORRIDGE POND
The current year data (the top graph) show that the in-lake transparency ***increased steadily*** from **June** to **August**. The transparency in **June** was ***slightly less than*** the state mean, and in **July** and **August** was ***greater than*** the state median.

The historical data (the bottom graph) show that the 2004 mean transparency is ***slightly greater than*** the state mean.

Overall, visual inspection of the historical data trend line (the bottom graph) shows a ***slightly decreasing (meaning slightly worsening)*** transparency trend since monitoring began.

MIDDLE PEA PORRIDGE POND
The current year data (the top graph) show that the in-lake transparency ***increased steadily*** from **June** to **August**. The transparency in **June** was ***slightly greater than*** the state mean and in **July** and **August** was ***greater than*** the state median.

The historical data (the bottom graph) show that the 2004 mean transparency is ***slightly greater than*** the state mean.

Overall, visual inspection of the historical data trend line (the bottom graph) shows a ***relatively stable*** transparency trend since monitoring began. Specifically, the mean transparency has ***remained between approximately 4.3 and 6.25 meters*** since ***1995.***

As previously discussed, since your group will have sampled the transparency at the deep spot of both ponds for at least 10 consecutive years, the 2005 annual report will include a statistical analysis of the historic data to determine if there has been a significant change in the annual mean since monitoring began.

Typically, high intensity rainfall causes erosion of sediments into lakes/ponds and streams, thus decreasing clarity. Efforts should continually be made to stabilize stream banks, lake/pond shorelines, disturbed soils within the watershed, and especially dirt roads located immediately adjacent to the edge of tributaries and the lake/pond. Guides to Best Management Practices designed to reduce, and possibly even eliminate, nonpoint source pollutants, such as sediment loading, are available from DES upon request.

- **Figure 3 and Table 8:** The graphs in Figure 3 (Appendix A) show the amount of phosphorus in the epilimnion (the upper layer) and the hypolimnion (the lower layer); the inset graphs show current year data. Table 8 (Appendix B) lists the annual maximum, minimum, and median concentration for each deep spot layer and each tributary since the lake/pond has joined the program.

  Phosphorus is the limiting nutrient for plant and algae growth in New Hampshire's freshwater lakes and ponds. Too much phosphorus in a lake/pond can lead to increases in plant and algal growth over time. **The median summer total phosphorus concentration in the epilimnion (upper layer) of New Hampshire's lakes and ponds is 12 ug/L. The median summer phosphorus concentration in the hypolimnion (lower layer) is 14 ug/L.**

  BIG PEA PORRIDGE POND
  The current year data for the epilimnion (the top inset graph) show that the phosphorus concentration ***increased slightly*** from **June** to **July**, and then ***decreased slightly*** from **July** to **August**. The phosphorus concentration on **each sampling event** was ***less than*** the state median.

  The current year data for the hypolimnion (the bottom inset graph) show that the phosphorus concentration ***increased*** from **June** to **July**, and then ***decreased*** from **July** to **August**. The phosphorus concentration on the **June** and **August** sampling event was ***less than*** the state median and on the **July** sampling event was ***slightly less than*** the state median.

The turbidity of the hypolimnion (lower layer) sample was ***slightly elevated*** (**1.74 NTUs**) on the **July** sampling event. This suggests that the lake/pond bottom may have been disturbed by the anchor or by the Kemmerer Bottle while sampling and/or that the lake bottom is covered by a thick organic layer of sediment which is easily disturbed. When the lake/pond bottom is disturbed, sediment, which typically contains attached phosphorus, is released into the water column. When collecting the hypolimnion sample, make sure that there is no sediment in the Kemmerer Bottle before filling the sample bottles.

Overall, visual inspection of the historical data trend line for the epilimnion shows a ***relatively stable*** phosphorus trend. Specifically, the mean annual concentration has ***remained between approximately 4.5 and 9.3 ug/L*** since monitoring began in ***1995.***

Overall, visual inspection of the historical data trend line for the hypolimnion shows a ***variable*** phosphorus trend since monitoring began. Specifically, the mean annual concentration has ***fluctuated between approximately 7.3 and 18.5 ug/L*** since monitoring began.

MIDDLE PEA PORRIDGE POND

The current year data for the epilimnion (the top inset graph) show that the phosphorus concentration ***decreased very gradually*** from **June** to **August**. The phosphorus concentration on **each sampling event** was ***less than*** the state median.

The current year data for the hypolimnion (the bottom inset graph) show that the phosphorus concentration ***increased steadily*** from **June** to **August**. This suggests that internal phosphorus loading is occurring in the hypolimnion. (Please refer to the discussion of Table 9 and 10 for more information regarding internal phosphorus loading. The phosphorus concentration in **June** was ***less than*** the state median, in **July** was ***slightly less than*** the state median, and in **August** was ***greater than*** the state median.

The turbidity of the hypolimnion (lower layer) sample was ***slightly elevated*** on the **July** and **August** sampling events (**2.96 and 2.85 NTUs,** respectively). This suggests that the lake/pond bottom may have been disturbed by the anchor or by the Kemmerer Bottle while sampling and/or that the lake bottom is covered by a thick organic layer of sediment which is easily disturbed. When the lake/pond bottom is disturbed, sediment, which typically contains attached phosphorus, is released into the water column. When collecting the hypolimnion sample, make sure that there is no sediment in the

Kemmerer Bottle before filling the sample bottles.

The historical data show that the 2004 mean hypolimnetic phosphorus concentration is ***slightly less than*** the state median.

Overall, visual inspection of the historical data trend line for the epilimnion shows a ***slightly variable*** phosphorus trend. Specifically, the mean annual concentration has ***fluctuated between approximately 3.0 and 9.3 ug/L*** since monitoring began in ***1995.***

Overall, visual inspection of the historical data trend line for the hypolimnion shows a ***variable*** phosphorus trend since monitoring began. Specifically, the mean annual concentration has ***fluctuated between approximately 7.3 and 15.5 ug/L*** since monitoring began.

One of the most important approaches to reducing phosphorus loading to a waterbody is to continually educate watershed residents about its sources and how excessive amounts can adversely impact the ecology and value of lakes and ponds. Phosphorus sources within a lake or pond's watershed typically include septic systems, animal waste, lawn fertilizer, road and construction erosion, and natural wetlands.

TABLE INTERPRETATION

- **Table 2: Phytoplankton**

  Table 2 (Appendix B) lists the current and historical phytoplankton species observed in the lake/pond. Specifically, this table lists the three most dominant phytoplankton species observed in the sample and their relative abundance in the sample. In addition, this table has been enhanced this year to include the overall phytoplankton cell abundance rating of the sample. The overall phytoplankton cell abundance in a sample is calculated using a formula based on the relationship that DES biologists have observed over the years regarding phytoplankton concentrations, algal concentrations, and biological productivity in New Hampshire's lakes and ponds. A mathematical equation is used to classify the overall abundance of phytoplankton cells in a sample into the following categories: *sparse*, *scattered*, *moderate*, *common*, *abundant*, and *very abundant.* Generally, the more phytoplankton cells there are in a sample, the higher the chlorophyll concentration and the higher the biological productivity of the lake.

BIG PEA PORRIDGE POND
The dominant phytoplankton species observed in the **June** sample were ***Chrysosphaerella* (golden-brown), *Rhizosolenia* (diatom),** and ***Asterionella* (diatom).**

The overall abundance of rating phytoplankton cells in the sample was calculated to be ***moderate.***

MIDDLE PEA PORRIDGE POND
The dominant phytoplankton species observed in the **June** sample were ***Asterionella* (diatom), *Rhizosolenia* (diatom),** and ***Dinobryon* (golden-brown).**

The overall abundance of rating phytoplankton cells in the sample was calculated to be ***moderate.***

Phytoplankton populations undergo a natural succession during the growing season (Please refer to the "Biological Monitoring Parameters" section of this report for a more detailed explanation regarding seasonal plankton succession). Diatoms and golden-brown algae are typical in New Hampshire's less productive lakes and ponds.

- **Table 2: Cyanobacteria**
  A **small amount** of the cyanobacteria ***Anabaena*** and ***Microcystis*** was observed in the **Big Pea Porridge Pond** plankton sample. In addition, a **small amount** of the cyanobacteria ***Anabaena*** was observed in the **Middle Pea Porridge Pond** plankton sample. ***These species, if present in large amounts, can be toxic to livestock, wildlife, pets, and humans.*** (Please refer to the "Biological Monitoring Parameters" section of this report for a more detailed explanation regarding cyanobacteria).

  Cyanobacteria can reach nuisance levels when phosphorus loading from the watershed to surface waters is increased (this is often caused by rain events) and favorable environmental conditions occur (such as a period of sunny, warm weather).

  The presence of cyanobacteria serves as a reminder of the lake's/pond's delicate balance. Watershed residents should continue to act proactively to reduce nutrient loading to the lake/pond by eliminating fertilizer use on lawns, keeping the lake/pond shoreline natural, re-vegetating cleared areas within the watershed, and properly maintaining septic systems and roads.

  In addition, residents should also observe the lake/pond in September and October during the time of fall turnover (lake mixing) to document any algal blooms that may occur. Cyanobacteria have the ability to regulate their depth in the water column by producing or releasing gas from vesicles. However, occasionally lake mixing can affect their buoyancy and cause them to rise to the surface and bloom. Wind and currents tend to “pile” cyanobacteria into scums that accumulate in one section of the lake/pond. If a fall bloom occurs, please collect a sample (any clean jar or bottle will be suitable) and contact the VLAP Coordinator.

- **Table 4: pH**

  Table 4 (Appendix B) presents the in-lake and tributary current year and historical pH data.

  pH is measured on a logarithmic scale of 0 (acidic) to 14 (basic). pH is important to the survival and reproduction of fish and other aquatic life. A pH below 6.0 limits the growth and reproduction of fish. A pH between 6.0 and 7.0 is ideal for fish. The mean pH value for the epilimnion (upper layer) in New Hampshire’s lakes and ponds is **6.6**, which indicates that the surface waters in the state are slightly acidic. For a more detailed explanation regarding pH, please refer to the “Chemical Monitoring Parameters” section of this report.

  The mean pH at the deep spot this season ranged from **5.95** in the hypolimnion to **6.39** in the epilimnion of **Big Pea Porridge Pond** and ranged from **5.91** in the hypolimnion to **6.36** in the epilimnion of **Middle Pea Porridge Pond**, which means that the water in both ponds is ***slightly acidic.***

  It is important to point out that the pH in the hypolimnion (lower layer) was ***lower (more acidic)*** than in the epilimnion (upper layer) in both ponds. This increase in acidity near the lake bottom is likely due the decomposition of organic matter and the release of acidic by-products into the water column.

  Due to the presence of granite bedrock in the state and acid deposition (from snowmelt, rainfall, and atmospheric particulates) in New Hampshire, there is not much that can be done to effectively increase lake/pond pH.

- **Table 5: Acid Neutralizing Capacity**

  Table 5 (Appendix B) presents the current year and historical epilimnetic ANC for each year the lake/pond has been monitored through VLAP.

Buffering capacity (ANC) describes the ability of a solution to resist changes in pH by neutralizing the acidic input. The mean ANC value for New Hampshire's lakes and ponds is **6.6 mg/L**, which indicates that many lakes and ponds in the state are at least "moderately vulnerable" to acidic inputs. For a more detailed explanation, please refer to the "Chemical Monitoring Parameters" section of this report.

The mean epilimnetic Acid Neutralizing Capacity (ANC) was **2.7 mg/L** in **Big Pea Porridge Pond** and **2.8 mg/L** in **Middle Pea Porridge Pond** this season, both of which are ***less than*** the state mean. In addition, this indicates that both ponds are ***moderately vulnerable*** to acidic inputs (such as acid precipitation).

- **Table 6: Conductivity**

Table 6 (Appendix B) presents the current and historical conductivity values for tributaries and in-lake data. Conductivity is the numerical expression of the ability of water to carry an electric current (which is determined by the number of negatively charged ions from metals, salts, and minerals in the water column). The mean conductivity value for New Hampshire's lakes and ponds is **59.4 uMhos/cm**. For a more detailed explanation, please refer to the "Chemical Monitoring Parameters" section of this report.

The mean annual epilimnetic conductivity in **Big Pea Porridge Pond** was **52.47 uMhos/cm**, which is ***slightly less than*** the state median. The mean annual epilimnetic conductivity in **Middle Pea Porridge Pond** was **64.32 uMhos/cm,** which is ***slightly greater than*** the state mean.

The conductivity has ***increased*** at the deep spot of both ponds (in particular, in **Middle Pea Porridge Pond**) and in the inlets since monitoring began.

Typically, sources of increased conductivity are due to human activity. These activities include septic systems, agricultural runoff, and road runoff (which contains road salt during the spring snow melt). New development in the watershed can alter runoff patterns and expose new soil and bedrock areas, which could contribute to increasing conductivity. In addition, natural sources, such as iron and manganese deposits in bedrock, can influence conductivity.

Culvert and drainage channel sampling was conducted in the **Spring of 2003** and **2004** soon after snow melt along the major roadways. The results from these sampling events show ***very high*** conductivity and chloride levels. (Please refer to the discussion of Table 13 for more information regarding chloride results.) It is likely that de-icing materials applied to nearby roadways during the winter months may be influencing the conductivity in the ponds. In New Hampshire, the most commonly used de-icing material is salt (sodium chloride).

A limited amount of chloride sampling was conducted this season. Please refer to the discussion of Table 13 for information regarding chloride results.

We also recommend that your monitoring group conduct a shoreline conductivity survey of at least **Middle Pea Porridge Pond** and the tributaries with ***elevated*** conductivity to help pinpoint the sources of ***elevated*** conductivity.

To learn how to conduct a shoreline or tributary conductivity survey, please refer to the 2004 "Special Topic Article" in Appendix D of this report.

- **Table 8: Total Phosphorus**

Table 8 (Appendix B) presents the current year and historical total phosphorus data for in-lake and tributary stations. Phosphorus is the nutrient that limits the algae's ability to grow and reproduce. Please refer to the "Chemical Monitoring Parameters" section of this report for a more detailed explanation.

BIG PEA PORRIDGE POND

The total phosphorus concentration was ***elevated*** (**82 ug/L**) in **Big Rock Inlet** on the **August** sampling event this season**.** The turbidity (Table 11) of the sample was also ***elevated*** (**4.54 NTUs**), which suggests that the stream bottom may have been disturbed while sampling or that erosion is occurring in this portion of the watershed.

When the stream bottom is disturbed, sediment that typically contains attached phosphorus is released into the water column. When collecting inlet samples, please be sure to sample where the stream is flowing and where the stream is deep enough to collect a "clean" sample.

This station has had a history of ***elevated*** and ***fluctuating*** phosphorus and turbidity levels. If you suspect that erosion is occurring in this portion of the watershed, we recommend that your monitoring group conduct a stream survey and storm event sampling along this inlet. This additional sampling may allow us to determine what is causing the ***elevated*** levels of turbidity and phosphorus.

For a detailed explanation on how to conduct rain event sampling and stream surveys, please refer to the 2002 VLAP Annual Report "Special Topic Article" or contact the VLAP Coordinator.

MIDDLE PEA PORRIDGE POND

The total phosphorus concentration in the tributary samples associated with this pond was relatively low and consistent with previous sampling seasons.

- **Table 9 and Table 10: Dissolved Oxygen and Temperature Data**

Table 9 (Appendix B) shows the dissolved oxygen/temperature profile(s) for the 2004 sampling season. Table 10 (Appendix B) shows the historical and current year dissolved oxygen concentration in the hypolimnion (lower layer). The presence of dissolved oxygen is vital to fish and amphibians in the water column and also to bottom-dwelling organisms. Please refer to the "Chemical Monitoring Parameters" section of this report for a more detailed explanation.

The dissolved oxygen concentration was ***lower in the hypolimnion (lower layer) than in the epilimnion (upper layer)*** at the deep spot of both ponds on the **June** sampling event. As stratified lakes/ponds age, and as the summer progresses, oxygen typically becomes ***depleted*** in the hypolimnion by the process of decomposition. Specifically, the loss of oxygen in the hypolimnion results primarily from the process of biological breakdown of organic matter (i.e.; biological organisms use oxygen to break down organic matter), both in the water column and particularly at the bottom of the lake/pond where the water meets the sediment. When oxygen levels are depleted to less than 1 mg/L in the hypolimnion (*as it has been in both ponds on at least two previous annual biologist visits*), the phosphorus that is normally bound up in the sediment may be re-released into the water column (a process referred to as ***internal phosphorus loading***).

This year the DES biologist conducted the temperature/dissolved oxygen profile in ***June.*** We recommend that the annual biologist visit for the 2005 sampling season be scheduled during ***August*** so that we can determine if oxygen is depleted in the hypolimnion ***later*** in the sampling season.

- **Table 11: Turbidity**

Table 11 (Appendix B) lists the current year and historical data for in-lake and tributary turbidity. Turbidity in the water is caused by suspended matter, such as clay, silt, and algae. Water clarity is strongly influenced by turbidity. Please refer to the "Other Monitoring Parameters" section of this report for a more detailed explanation.

BIG PEA PORRIDGE POND
As discussed previously, the turbidity of the hypolimnion (lower layer) sample was ***slightly elevated*** on the **June** sampling event. This suggests that the lake/pond bottom may have been disturbed by the anchor or by the Kemmerer Bottle while sampling and/or that the lake bottom is covered by a thick organic layer of sediment which is easily disturbed.

Also discussed previously, the turbidity in **Big Rock Inlet** was ***elevated*** on the **July** and **August** sampling events, which suggests that the stream bottom may have been disturbed while sampling or that erosion is occurring in this portion of the watershed.

MIDDLE PEA PORRIDGE POND
The turbidity of the hypolimnion (lower layer) sample was ***slightly elevated*** on the **July** and **August** sampling events. This suggests that the lake/pond bottom may have been disturbed by the anchor or by the Kemmerer Bottle while sampling and/or that the lake bottom is covered by a thick organic layer of sediment which is easily disturbed.

The turbidity in the **Outlet** sample was slightly ***elevated*** on the **July** sampling event which suggests that the stream bottom may have been disturbed while sampling or that erosion is occurring in this portion of the watershed.

- **Table 12: Bacteria (*E.coli*)**

Table 12 lists the current year and historical data for bacteria (*E.coli*) testing. (Please note that Table 12 now lists the maximum and minimum results for this season and for all past sampling seasons.) *E. coli* is a normal bacterium found in the large intestine of humans and other warm-blooded animals. *E.coli* is used as an indicator organism because it is easily cultured and its presence in the water, in defined amounts, indicates that sewage **MAY** be present. If sewage is present in the water, potentially harmful disease-causing organisms **MAY** also be present.

BIG PEA PORRIDGE POND
The *E.coli* concentration was **low *(10 counts or less)*** at each of the sites tested this season. We hope this trend continues!

If residents are concerned about sources of bacteria such as failing septic systems, animal waste, or waterfowl waste, it is best to conduct *E. coli* testing when the water table is high, when beach use is heavy, or immediately after rain events.

MIDDLE PEA PORRIDE POND

The *E. coli* concentration at **Geneva Beach** was ***elevated*** on the **June** sampling event. Specifically, the result of **98** counts per 100 mL ***was greater than*** the state standard of 88 counts per 100 mL for designated public beaches. We are happy to report that the *E.coli* concentration in the samples collected in **July** and **August** at **Geneva Beach** were ***much lower (10 and 6 counts per 100mL, respectively).***

We recommend that your group continue *E.coli* sampling at this station next season. If the results continue to be ***elevated***, we will recommend that your group conduct a series of tests on a weekend during heavy beach use and also immediately after a rain event. This additional sampling may help us determine the source of the bacteria.

For a detailed explanation on how to conduct rain event sampling, please refer to the 2002 VLAP Annual Report "Special Topic Article" or contact the VLAP Coordinator.

- **Table 13: Chloride**

The chloride ion (Cl^-) is found naturally in some surfacewaters and groundwaters and in high concentrations in seawater. Research has shown that ***elevated*** chloride levels can be toxic to freshwater aquatic life. In order to protect freshwater aquatic life in New Hampshire, the state has adopted **acute and chronic** chloride criteria of **860 and 230 mg/L** respectively. The chloride content in New Hampshire lakes is naturally low, generally less than 2 mg/L in surface waters located in remote areas away from habitation. Higher values are generally associated with salted highways and, to a lesser extent, with septic inputs. Please refer to the "Chemical Monitoring Parameters" section of this report for a more detailed explanation.

As discussed previously, chloride testing was conducted in **March** at many locations near roadway culverts and drainage areas. The chloride results ranged from **49 to 191 mg/L**, which is ***less than*** state acute and chronic chloride standards, but is the ***higher than*** we would expect to measure in New Hampshire's lakes and ponds.

On the **June** biologist visit, the epilimnion of **Big Pea Porridge Pond** and **Middle Pea Porridge Pond** was sampled for chloride. The results were **9 and 12 mg/L**, respectively, which is ***relatively low.***

We recommend that your monitoring group continue to conduct chloride sampling in the epilimnion at each deep spot and the major roadway drainage areas to each pond, particularly in the spring soon after snow-melt and after rain events during the summer. This will establish a baseline of data which will assist your monitoring group and DES in determining lake quality trends in the future.

Please read this year's Special Topic Article, "Conductivity is on the rise in New Hampshire's Lakes and Ponds: What is causing the increase and what can be done?" which is found in Appendix D of this report. This article may help your association understand what types of activities can lead to elevated conductivity and chloride levels and what residents can do to minimize this type of pollution.

- **Table 14: Current Year Biological and Chemical Raw Data**
  This table is a new addition to the Annual Report. This table lists the most current sampling season results. Since the maximum, minimum, and annual mean values for each parameter are not shown on this table, this table displays the current year "raw" (meaning unprocessed) data. The results are sorted by station, depth zone (epilimnion, metalimnion, and hypolimnion) and parameter.

- **Table 15: Station Table**
  This table is a new addition to the Annual Report. As of the Spring of 2004, all historical and current year VLAP data are included in the DES Environmental Monitoring Database (EMD). To facilitate the transfer of VLAP data into the EMD, a new station identification system had to be developed. While volunteer monitoring groups can still use the sampling station names that they have used in the past (and are most familiar with), an EMD station name also exists for each VLAP sampling location. For each station sampled at your lake or pond, Table 15 identifies what EMD station name corresponds to the station names you have used in the past and will continue to use in the future.

DATA QUALITY ASSURANCE AND CONTROL

Annual Assessment Audit:

During the annual visit to your lake/pond, the biologist conducted a "Sampling Procedures Assessment Audit" for your monitoring group. Specifically, the biologist observed the performance of your monitoring group while sampling and filled out an assessment audit sheet to document the ability of the volunteer monitors to follow the proper field sampling procedures (as outlined in the VLAP Monitor's Field Manual). This assessment is used to identify any aspects of sample collection in which volunteer monitors fail to follow proper procedures, and also provides an opportunity for the biologist to retrain the volunteer monitors as necessary. This will ultimately ensure that the samples that the volunteer monitors collect are truly representative of actual lake and tributary conditions.

Overall, your monitoring group did an ***excellent*** job collecting samples on the annual biologist visit this season! Specifically, the members of your monitoring group followed the proper field sampling procedures and there was no need for the biologist to provide additional training. Keep up the good work!

Sample Receipt Checklist:

Each time your monitoring group dropped off samples at the laboratory this summer, the laboratory staff completed a sample receipt checklist to assess and document if the volunteer monitors followed proper sampling techniques when collecting the samples. The purpose of the sample receipt checklist is to minimize, and hopefully eliminate, future re-occurrences of improper sampling techniques.

Overall, the sample receipt checklist showed that your monitoring group did an ***excellent*** job when collecting samples and submitting them to the laboratory this season! Specifically, the members of your monitoring group followed the proper field sampling procedures and there was no need for the laboratory staff to contact your group with questions, and no samples were rejected for analysis.

USEFUL RESOURCES

Best Management Practices to Control Nonpoint Source Pollution: A Guide for Citizens and Town Officials, NHDES Booklet WD-03-42, (603) 271-2975.

Best Management Practices for Well Drilling Operations, NHDES Fact Sheet WD-WSEB-21-4, (603) 271-2975 or www.des.nh.gov/factsheets /ws/ws-21-4.htm.

Canada Geese Facts and Management Options, NHDES Fact Sheet BB-53, (603) 271-2975 or www.des.state.nh.us/factsheets/bb/bb-53.htm.

Cyanobacteria in New Hampshire Waters Potential Dangers of Blue-Green Algae Blooms, NHDES Fact Sheet WMB-10, (603) 271-2975 or www.des.state.nh.us/factsheets/wmb/wmb-10.htm.

Erosion Control for Construction in the Protected Shoreland Buffer Zone, NHDES Fact Sheet WD-SP-1, (603) 271-2975 or www.des.state.nh.us/ factsheets/sp/sp-1.htm.

Freshwater Jellyfish In New Hampshire, NHDES Fact Sheet WD-BB-5, (603) 271-2975 or www.des.state.nh.us/factsheets/bb/bb-51/htm.

Impacts of Development Upon Stormwater Runoff, NHDES Fact Sheet WD-WQE-7, (603) 271-2975 or www.des.state.nh.us/factsheets/wqe/wqe-7.htm.

IPM: An Alternative to Pesticides, NHDES Fact Sheet WD-SP-3, (603) 271-2975 or www.des.state.nh.us/factsheets/sp/sp-3.htm.

Iron Bacteria in Surface Water, NHDES Fact Sheet WD-BB-18, (603) 271-2975 or www.des.state.nh.us/factsheets/bb/bb-18.htm.

Lake Foam, NHDES Fact Sheet WD-BB-4, (603) 271-2975 or www.des.state.nh.us/factsheets/bb/bb-5.htm.

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